

**YAESU**  
The radio

**FT-991A**  
HF/VHF/UHF  
ALL MODE TRANSCEIVER

CW  
1.820

SSB  
14.195

SSB  
144.200

C4FM  
146.520

CW  
7.030

SSB  
21.295

FM  
446.000



⟨Actual size⟩

Explore the Vast Ocean of Radio waves  
HF through UHF

《Wide-Coverage Transceiver》

With Real-Time Spectrum Scope and Multi-Color Waterfall Display

# An all-around model with a built-in real-time spectrum scope and superior basic performance

## All modes from HF to UHF bands condensed into a small body

Covers the amateur radio bands from 160 m to 70 cm, and is capable of all modes SSB/CW/AM/FM, even the high-definition C4FM digital mode. All this condensed into a compact body W: 9" x H: 3.2" x D: 10" (229 x 80 x 253 mm). This is all the radio you will need to enjoy the wide world of amateur radio.



## Supports Real-Time Spectrum Scope with Multi-Color Waterfall Display

### Instantly evaluate band conditions with the built-in real-time spectrum scope

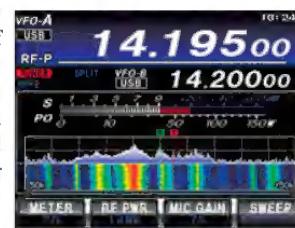
Listen to the received audio while tuning with the built-in high resolution real-time spectrum scope. Instantly evaluate ever-changing band conditions and easily find the desired signals. TX and RX markers are displayed on the scope for immediate grasp of the relationship between the TX and RX frequencies. The display color of the scope screen can be selected as desired.



Real-time spectrum scope display

### Supports multi-color waterfall display

The waterfall display function presents the strength of the RX signals using color variations flowing with time. This allows for visual recognition of even the faint signals which rarely appear as peaks, offering a more detailed view of the band. The colors of the waterfall screen can be selected from seven color displays or multicolor.



Multi-color waterfall display

## Latest Touch Panel Operation, Combined With Traditional Front Panel Layout, Achieve Optimal Ease of Use

### 3.5 inch full color touch panel display for convenient comfortable operating



- Full color TFT LCD display provides useful information about function status and settings at a glance
- Highly responsive panel with functional design and intuitive layout makes touch operation a pleasure
- Four user-customizable function keys offer quick access to mode-dependent assignments
- Traditional layout of Main Dial knob and related controls makes experienced users feel right at home

## Uncompromising Circuit Design Ensures Excellent Receiver Performance from HF to VHF/UHF

### Sophisticated receiver front end engineering is on a par with FTDX Series Transceivers

- Triple conversion with 1st IF frequency of 69.450 MHz for all bands \* SSB/CW/AM
- 1st IF stage implements a narrow bandwidth 3 kHz roofing filter as standard equipment  
Designed for outstanding adjacent multi signal characteristics, not only in HF but also in VHF and UHF bands.
- Features the highly acclaimed quad mixer of the FTDX series transceivers, along with a dedicated VHF/UHF mixer

The 1st IF mixer for HF/50 MHz features a quad mixer with four 3SK294 dual-gate MOS-FET devices that assure extremely low noise, excellent intermodulation characteristics, and high dynamic range. A dedicated VHF/UHF mixer, separate from the HF bands, permits design optimization for targeted frequencies, and results in superior performance characteristics.



3 kHz and 15 kHz Roofing Filter



HF/50 MHz Quad Mixer

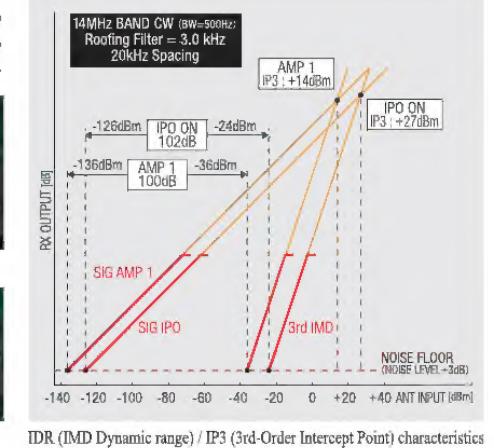


VHF/UHF Mixer

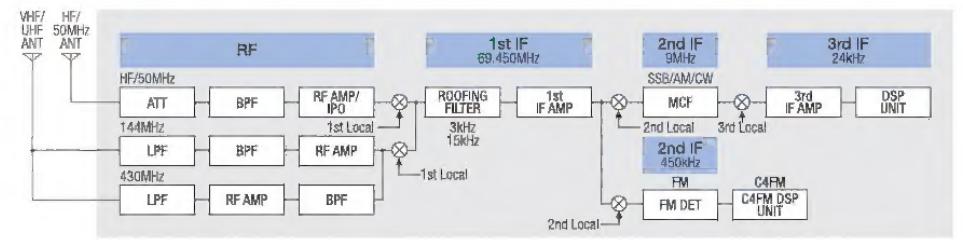
### RF amplifier design is optimized for each band

- Selectable IPO/AMP1/AMP2 (HF/50 MHz) settings for optimized operation with any received signal
- Separate RF amplifiers provide the best characteristics for each band

The IPO, AMP1 and AMP2 selections for the HF/50 MHz bands allow matching the settings to the current band and conditions, to ensure optimal RF amplifier operation. The RF amplifier for the 430 MHz band uses high-electron-mobility transistor (HEMT) NE3509 devices which maintain good performance into the GHz range, and combine high gain with a low NF (Noise Figure).



IDR (IMD Dynamic range) / IP3 (3rd-Order Intercept Point) characteristics



Receiver Block Diagram

## The YAESU IF DSP is Famous for Superb Interference Rejection

## Same high-speed floating point DSP as used in FTDX Series

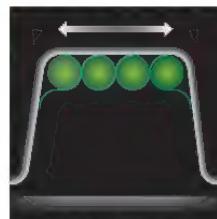
The high speed floating point DSP chip TMS320C6746 (3000 MIPS / 2250 MFLOPS) from Texas Instruments, makes possible excellent interference rejection with actual signals under real-world conditions, not only in the HF but also in the VHF and UHF bands.



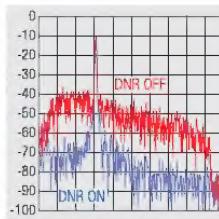
32-bit High Speed Floating Point DSP

## Highly effective interference rejection

The IF WIDTH and IF SHIFT functions are the basis for removing interfering signals and are easily implemented for the best effect. The efficacy of interference rejection is further enhanced by sophisticated functions inherited from the FTDX series, such as the 16-stage digital noise reduction and the DNF (AUTO NOTCH) filter that rapidly tracks even multiple heterodynes. The CONTOUR function that enhances the desired signal with a natural sound, and the NOTCH function with selectable bandwidth, along with other functions are provided for comfortable and convenient DX and Contest QSO operation.



CONTOUR Filter Conceptual Diagram



Digital Noise Reduction Performance

## Final Stage with Ample Power Reserves: 100 W for HF/50 MHz Band and 50 W for VHF/UHF Band

## High quality push-pull amplifier with 100 watts for HF/50 MHz

Using a push-pull arrangement of RD100HHF1 MOS-FET devices, renowned for excellent performance in the HF/50 MHz range, the amplifier delivers 100 watts of low-distortion, high-quality power.

## 50 W amplifier for VHF/UHF assures plenty of power for high frequency bands

The final amplifier for the VHF and UHF bands uses the high-output MOS-FET RD70HFU2 device which incorporates two MOS-FETs in a single package, providing ample output power of 50 watts.



V/UHF Final MOS FET RD70HFU2 Device

## High speed 1.8 to 54 MHz antenna tuner included as standard equipment

The high speed digital tuner employs relay switching and features a large 100-channel tuning data memory. This allows the user to instantly call up optimum matching conditions for previously used frequencies.

## Support for Advanced C4FM Digital Functions

- V/D mode for simultaneous transmission of voice and data with powerful error correction optimal for mobile use, and Voice FR (Full Rate) mode for high quality audio transmission
- AMS function instantly recognizes digital mode or FM mode and enables mutual communication
- GM (Group Monitor) function allows handy on-screen display of group members that are within communication range
- 126 types of DSQ (Digital Squelch) enable specific selection of communicating stations
- Supports high-definition Amateur Radio WIRES-X internet connection, utilizing C4FM digital technology

\* Does not support operation of WIRES-X digital node stations.  
\* Does not support sending and receiving of images via C4FM digital.

## Basic function

## Versatile Array of Functions for CW Operation

- Advanced electronic keying (4 to 60 wpm) with FULL BK-IN support
- Electronic Keyer Weight control (2.5 - 4.5)
- CW side tone pitch frequency adjustable (300 - 1050 Hz)
- Message Memory function (5 ch x 50 characters)
- APF function with 3-stage bandwidth selection improves S/N ratio for enhanced intelligibility
- Auto Zero-in function facilitates subtle tuning operations for CW
- Automatic "Beacon" keyer mode
- CW SPOT Feature
- CW Mode reversal (USB or LSB injection)

## Convenient Functions for FM Mode

- 104 types of DCS (Digital Code Squelch)
- ARS function provides easy repeater access
- 50-tone CTCSS Encoder/Decoder for FM operation



HF/VHF/UHF 100 W All Mode Transceiver (144 MHz / 430 MHz 50 W)

# **FT-991A**

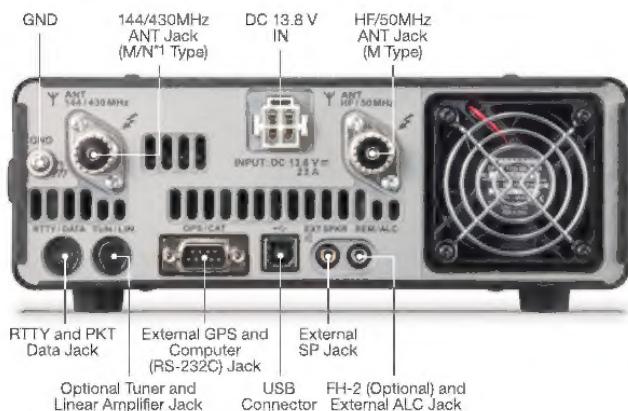
## Useful and Convenient Functions

- Speech Processor ■ Parametric MIC EQ ■ Five-channel digital voice message memory function for repetitive voice messages ■ MULTI dial design facilitates setting operations ■ White LED Key button Illumination
- Independent AF GAIN, RF GAIN and CLAR/VFO-B knobs ■ FH-2 Remote Control (Optional) ■ VOX ■ MOX ■ 99 channel memory (supports memory group view, 12 alphanumeric characters) ■ RTTY/DATA Jack
- TUN/LIN connector allows connection of optional VL-1000 or FC-40 ■ Wide Band Receive Capability (30kHz-56MHz, 118-164MHz, 420-470MHz) ■ CS key brings up a preselected menu with a single touch
- USB port allows connection to a PC with a single cable (CAT control, Audio In/Out interface, PTT/RTTY(FSK) SHIFT control) ■ High Stability 0.5 ppm TCXO ■ Carrying Handle ■ Tilt Stand

## Specifications

| General                        |  |
|--------------------------------|--|
| RX Frequency Range             | 0.03 - 56 MHz, 118 - 164 MHz, 420 - 470 MHz (operating), 1.8 - 54 MHz, 144 - 148MHz, 430 - 450 MHz (specified performance, Amateur bands only)   |
| TX Frequency Ranges            | 1.8 - 54 MHz, 144 - 148MHz, 430 - 450 MHz (Amateur bands only)   |
| Frequency Stability            | ±0.5 ppm (after 1 minute @14°F - +122°F/-10°C - +50°C)   |
| Operating Temperature Range    | +14°F - +122°F (-10°C - +50°C)   |
| Emission Modes                 | A1A (CW), A3E (AM), J3E (LSB, USB), F2D, F3E (FM), F7W (C4FM)  |
| Frequency Steps                | 5 / 10 Hz (SSB, CW, AM), 100 Hz (FM, C4FM)   |
| Antenna Impedance              | 50 Ohms, unbalanced<br>16.7 - 150 Ohms, unbalanced (Tuner ON, 1.8 - 30 MHz Amateur bands)<br>25 - 100 Ohms, unbalanced (Tuner ON, 50 MHz Amateur band)   |
| Power Consumption (Approx.)    | RX (no signal) 1.8 A<br>RX (signal present) 2.2 A<br>TX 23 A (HF/50MHz 100 W), 15 A (144/430MHz 50 W)  |
| Supply Voltage                 | DC 13.8 V ±15 % (Negative Ground)  |
| Dimensions (W x H x D)         | 9.0" x 3.2" x 10" (229 x 80 x 253 mm)  |
| Weight (Approx.)               | 9.5 lbs (4.3 kg)   |
| Transmitter                    |  |
| Power Output                   | HF/50MHz: 5 - 100 watts (2 - 25 watts AM carrier)<br>144/430MHz: 5 - 50 watts (2 - 12.5 watts AM carrier)  |
| Modulation Types               | J3E (SSB); Balanced / A3E (AM); Low-Level (Early Stage); F3E (FM); Variable Reactance / F7W (C4FM); 4-level FSK  |
| Maximum FM Deviation           | ±5.0 kHz / ±2.5 kHz  |
| Harmonic Radiation             | Better than -50 dB (1.8 - 30 MHz Amateur bands)<br>Better than -63 dB (1.8 - 30 MHz Amateur bands, above 30MHz)*1<br>Better than -63 dB (50 MHz Amateur band)<br>Better than -60 dB (144 MHz, 430 MHz Amateur bands) |
| SSB Carrier Suppression        | At least 50 dB below peak output   |
| Undesired Sideband Suppression | At least 50 dB below peak output   |
| Bandwidth                      | 3 kHz (LSB/USB), 500 Hz (CW), 6 kHz (AM), 16 kHz (FM/C4FM)   |
| Audio Response (SSB)           | Not more than -6 dB from 300 to 2700 Hz  |
| Microphone Impedance           | 600 Ohms (200 to 10 kOhms)   |

## Rear Panel



| Receiver                  |   |
|---------------------------|---|
| Circuit Type              | SSB/CW/AM: Triple-conversion Super heterodyne<br>FM/C4FM: Double-conversion Super heterodyne  |
| Intermediate Frequencies  | SSB/CW/AM: 69.450 MHz / 9.000 MHz / 24 kHz<br>FM/C4FM: 69.450 MHz / 450 kHz   |
| Sensitivity               | SSB/CW (BW: 2.4 kHz, 10 dB S+N/N)<br>0.158 µV (1.8 - 30 MHz) (AMP 2), 0.125 µV (50 - 54 MHz) (AMP 2)<br>0.11 µV (144 - 148 MHz), 0.11 µV (430 - 450 MHz)<br>AM (BW: 6 kHz, 10 dB S+N/N, 30 % modulation @400 Hz)<br>5 µV (0.5 - 1.8 MHz) (AMP2), 1.6 µV (1.8 - 30 MHz) (AMP 2)<br>1.25 µV (50 - 54 MHz) (AMP 2)<br>FM (BW: 15 kHz, 12 dB SINAD)<br>0.35 µV (28 - 30 MHz) (AMP 2), 0.35 µV (50 - 54 MHz) (AMP 2)<br>0.18 µV (144 - 148 MHz), 0.18 µV (430 - 440 MHz)<br>There is no specification for frequency ranges not listed. |
| Squelch Sensitivity (TYP) | SSB/CW/AM<br>1.0 µV (1.8 - 30 MHz, 50 - 54 MHz, AMP 2)<br>1.0 µV (144 - 148 MHz, 430 - 450 MHz)<br>FM<br>0.35 µV (28 - 30 MHz, 50 - 54 MHz, AMP 2)<br>0.125 µV (144 - 148 MHz, 430 - 450 MHz)<br>There is no specification for frequency ranges not listed.   |
| Selectivity               | Mode -6 dB -60 dB<br>CW 0.5 kHz or better 0.75 kHz or less<br>SSB 2.4 kHz or better 3.5 kHz or less<br>AM 6 kHz or better 15 kHz or less<br>FM 12 kHz or better 30 kHz or less (-50dB)  |
| Image Rejection           | 70 dB or better (160 - 6m Amateur bands)<br>60 dB or better (2m, 70cm Amateur band)   |
| Maximum Audio Output      | 2.5 W into 4 Ohms with 10% THD  |
| Audio Output Impedance    | 4 to 8 Ohms (4 Ohms: nominal)   |
| Conducted Radiation       | Less than 4 nW  |

Specifications are subject to change, in the interest of technical improvement, without notice or obligation, and are guaranteed only within the amateur bands.  
Supplied Accessories: MH-31A8J Hand Microphone, T9025225 DC Cable

## Option

| VL-1000  |  |
|--|--|
| HF - 50 MHz 1 kW Linear Amplifier *2 *3 *4<br>(50 MHz 500 W/USA Version)<br>Automatic Antenna Tuner Built In |  |
| VL-1000  |  |
| VL-1000 Power Supply *2 *3 *4  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |
|  |  |

About this brochure: We have made this brochure as comprehensive and factual as possible. We reserve the right, however, to make changes at any time in equipment, optional accessories, specifications, model numbers, and availability. Precise frequency range may be different in some countries. Some accessories shown herein may not be available in some countries. Some information may have been updated since the time of printing; please check with your Authorized Yaesu Dealer for complete details.

\*1 European version only \*2 USA and Asian version only \*3 VL-1000 and FH-2 cannot be used simultaneously \*4 VL-1000, FC-40, and ATAS-120A cannot be used simultaneously

**YAESU**  
The radio

**YAESU MUSEN CO., LTD.** <http://www.yaesu.com/jp>

Tennozu Parkside Building  
2-5-8 Higashi-Shinagawa, Shinagawa-ku, Tokyo 140-0002, Japan

**YAESU USA** <http://www.yaesu.com>

US Headquarters 6125 Phyllis Drive, Cypress, CA 90630, U.S.A.

**YAESU UK** <http://www.yaesu.co.uk>

Unit 12, Sun Valley Business Park, Winnall Close  
Winchester, Hampshire, SO23 0LB, U.K.